

Claims

- [c1] 1.A method of forming an extruded thin-walled article comprising:
providing a polymeric binder system comprising a substantially homogeneous solution of a polymeric binder and an organic solvent;
adding a ceramic or metal powder to said polymeric binder system to form a mixture;
evaporating said organic solvent from said mixture; and
extruding the remaining mixture from a die to form a thin-walled green article.
- [c2] 2.The method of claim 1 further including heating said extruded thin-walled green article to burn-off said binder and to sinter the article.
- [c3] 3.The method of claim 1 wherein said polymeric binder comprises a thermoplastic block copolymer, a first thermoplastic polymer, a second thermoplastic polymer different from said first thermoplastic polymer, and a plasticizer.
- [c4] 4.The method of claim 3 wherein said thermoplastic block copolymer comprises a copolymer of styrene and butadiene.
- [c5] 5.The method of claim 3 wherein said first thermoplastic polymer comprises polystyrene.
- [c6] 6.The method of claim 3 wherein said second thermoplastic polymer comprises polyindene.
- [c7] 7.The method of claim 3 wherein said polymeric binder further includes an antioxidant.
- [c8] 8.The method of claim 3 wherein said plasticizer comprises at least one oil and at least one wax.
- [c9] 9.The method of claim 1 wherein said solvent is toluene or tetrahydrofuran.
- [c10] 10.The method of claim 1 wherein said solvent is selected from cyclohexane, methylcyclohexane, benzene, ethylbenzene, styrene, lower chlorinated aliphatic hydrocarbons, tetrahydrofurfuryl alcohol, phenol/acetone,

dimethyltetrahydrofuran, dioxane, methyl ethyl ketone, diisopropylketone, cyclohexanone, ethyl acetate, butyl acetate, n-butyl phthalate, carbon disulfide, and tributyl phosphate.

- [c11] 11.The method of claim 1 wherein said remaining mixture is extruded at a temperature of between about 100 to 135 ° C.
- [c12] 12.The method of claim 1 wherein said ceramic powder comprises yttria-stabilized zirconia.
- [c13] 13.The method of claim 1 wherein said metal precursor powder comprises nickel oxide plus yttria-stabilized zirconia.
- [c14] 14.A thin-walled article formed by the method of claim 2.
- [c15] 15.The thin-walled article of claim 14 wherein said article is tubular in shape.
- [c16] 16. A method of making a polymeric binder system for use in extruding thin-walled articles comprising:
providing a polymeric binder; and
dissolving said polymeric binder in an organic solvent to form a substantially homogeneous liquid.
- [c17] 17.The method of claim 16 wherein said polymeric binder comprises a thermoplastic block copolymer, a first thermoplastic polymer, a second thermoplastic polymer different from said first thermoplastic polymer, and a plasticizer.
- [c18] 18.The method of claim 17 wherein said thermoplastic block copolymer comprises a copolymer of styrene and butadiene.
- [c19] 19.The method of claim 17 wherein said first thermoplastic polymer comprises polystyrene.
- [c20] 20.The method of claim 17 wherein said second thermoplastic polymer comprises polyindene.
- [c21] 21.The method of claim 17 wherein said polymeric binder further includes an

antioxidant.

- [c22] 22.The method of claim 17 wherein said plasticizer comprises at least one oil and at least one wax.
- [c23] 23.The method of claim 17 wherein said solvent is toluene or tetrahydrofuran.
- [c24] 24.A polymeric binder system for use in extruding a thin-walled article comprising:
a polymeric binder comprising a thermoplastic block copolymer, a first thermoplastic polymer, a second thermoplastic polymer different from said first thermoplastic polymer, and a plasticizer; and
an organic solvent.
- [c25] 25.The polymeric binder system of claim 24 wherein said organic solvent is toluene or tetrahydrofuran.
- [c26] 26.The polymeric binder system of claim 24 wherein said organic solvent has been substantially evaporated from said system.
- [c27] 27.A composition for use in extruding a thin-walled article comprising:
a mixture of a polymeric binder system comprising a thermoplastic block copolymer, a first thermoplastic polymer, a second thermoplastic polymer different from said first thermoplastic polymer, a plasticizer, and an organic solvent; and
a ceramic or metal powder; wherein said organic solvent has been substantially evaporated from said system.